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ORIGINAL ARTICLE

Pornography, Individual Differences in Risk and Men's Acceptance of Violence Against Women in a Representative Sample

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Abstract Based on the Confluence Model of Sexual Aggression, we hypothesized that individual differences in risk for sexual aggression moderate the association between pornography use and attitudes supporting violence against women. This hypothesis was in keeping with the findings of a recent meta-analysis which indicated such a positive association between porn use and attitudes. However, in this meta-analysis there was also a high degree of heterogeneity among studies, suggesting the existence of crucial moderating variables. Unfortunately, the available literature included in this meta-analysis did not enable identifying the basis for such moderation. To fully test our hypothesis of individual differences moderation and related hypotheses requires a representative sample. Fortunately, a unique nationally representative sample of U.S. men in any form of post-high school education that we obtained in 1984–85 enabled testing our predictions. Participants had anonymously completed questionnaires that included items pertaining to pornography use, attitudes about violence against women, and other measures assessing risk factors highlighted by the Confluence Model. As predicted, while we found an overall positive association between pornography consumption and attitudes, further examination showed that it was moderated by individual differences. More specifically, as predicted this association was found to be largely due to men at relatively high risk for sexually aggression who were relatively frequent pornography consumers. The findings help resolve inconsistencies in the literature and are in line not only with experimental research on attitudes but also with both experimental and non-experimental studies assessing the relationship between pornography consumption and sexually aggressive behavior.

Keywords Pornography · Attitudes supporting violence · Confluence Model · Rape myths

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Introduction

Epidemiological studies in various countries have shown that pornography has become very easily accessible and is widely used, particularly by youth and young adults (Coopersmith 2000, 2006; Hald 2007; Wallmyr and Welin 2006), highlighting the importance of well conducted studies into potential effects of consumption of such media. Data from a wide variety of experimental and correlational studies, primarily conducted with U.S. student and general population samples, which are the participants of all studies

referred to in this article unless otherwise identified, have converged to show that pornography consumption can be a risk factor for sexually aggressive outcomes (e.g., attitudes and aggressive behavior). However, these studies also show that at least for aggressive behavior (e.g., Vega and Malamuth 2007; Malamuth et al. 2000), such increased risk only occurs for males who are more predisposed to sexual aggression and who use pornography relatively frequently. To date, research has not adequately examined whether such individual differences pertain to the association between pornography use and aggressive attitudes as well (Hald et al. 2010). The present study adds to existing knowledge by using a survey administered anonymously to a unique nationally representative sample of U.S. males in any form of post-high school education to systematically examine whether a theoretically guided classification of individual differences in risk can explain the heterogeneity found in the recent meta-analysis of the current attitudes literature (see Hald et al. 2010 and described below). It is designed to help reconcile the findings of studies published in the scientific literature generally and in this journal specifically (e.g., Lanis and Covell 1995. Milburn et al. 2000; Murnen et al. 2002; Taylor 2006) that have yielded conflicting findings that have not been adequately reconciled. We recognize that since our data assess the attitudes of American men who were in some form of post-high school education during the 1980s, we should not assume that the results can be generalized across other populations, cultures and other time periods, an issue that is more fully addressed in the presentation below.

In the controversy about effects of exposure to pornography, attitudes have long held a central role. In the present research, we focus on attitudes supporting violence against women (ASV). By this term we refer to a) positive affective responses to acts such as rape, other types of sexual aggression, and partner violence, b) evaluative cognitions justifying these acts, and c) behavioral predispositions or attractions toward such aggressive acts (Hald et al. 2010).

While potential effects of pornography on attitudes constitute important changes in and of themselves (Brownmiller 1975), they are also of major interest due to findings showing that attitudes in confluence with other factors predict and may contribute to real world sexually aggressive behaviors (e.g., Hall et al. 2006; Malamuth et al. 1991, 1995). With respect to the role of pornography consumption, as described in more detail below, previous correlational and experimental studies provided considerable support for the conclusion that pornography consumption can increase ASV and most studies have used the same measures as in the present research. Moreover, Lanis and Covell (1995) found that exposure to advertisements portraying "women as sex objects" (p. 646) also significantly influenced undergraduate Canadian men's responses to similar measures of ASV. In addition, using other measures, some studies conducted in the 1980s with American college students reported effects of exposure to pornography on men's "sexual callousness" and beliefs that women enjoy being victimized by sexual aggression (e.g., Check and Guloien 1989; Zillmann 1989). However, as described below, meta-analyses of such research have appeared indicate some inconsistency in the findings.

Before considering these meta-analyses, it is relevant to call attention to recent longitudinal research documenting similar significant effects on other types of attitudes that may be related to ASV (1980). For example, Brown and L'Engle (2009) conducted a prospective survey between 2001–04 of a diverse sample of American early adolescents. Their longitudinal analyses showed that early exposure to sexually explicit media (including magazines, movies and the Internet) for both males and females predicted less progressive gender role attitudes and having oral sex and sexual intercourse 2 years later. For males, such early exposure also predicted greater sexual harassment perpetration 2 years later. In a similar longitudinal three wave panel study of Dutch adolescents that began in 2006, Peter and Valkenburg (2009) reported that exposure to Internet sexually explicit media increased "notions of women as sex objects (p. 419)." The results from ASV studies (conducted over the last 30 years primarily with North American participants) focusing on the role of pornography have been summarized in an earlier (Allen et al. 1995b) and more recent (Hald et al. 2010) meta-analyses and reviews (Kingston et al. 2009). These summaries have appropriately differentiated the findings of methodologies using random assignment to conditions (i.e., experimental studies) and those focusing on naturally occurring associations (i.e., non-experimental studies). Allen et al. (1995b) reported that their meta-analysis of the *experimental* studies revealed a significant effect of pornography consumption on ASV with a stronger effect for violent than non-violent pornography. These conclusions were in line with other meta-analyses by Allen and associates focusing on the association between pornography consumption and aggressive behaviors in both experimental and non-experimental studies (e.g., Allen et al. 1995a). In contrast, for the relationship between ASV and pornography consumption in *non-experimental studies*, Allen et al. (1995b) did not find a significant overall association and found considerable contradiction among the findings. Apart from being inconsistent with and in contrast to all their other meta-analyses on pornography and ASV, this discrepancy between the findings of experimental and non-experimental studies in the area of attitudes and pornography has been cited by other researchers as raising doubts about the generalizability of the findings from experimental studies to real world settings (e.g., Lo and Ran 2005; Seto et al. 2001; Taylor 2006). Also, if correct, this finding constitutes a major challenge for models positing

that ASV are one of the interacting pathways mediating and moderating behavioral effects of pornography (e.g., Flood 2009; Malamuth et al. 2000). Recently, however, Hald et al. (2010) identified a variety of problems with the Allen et al. (1995b) meta-analysis of pornography consumption and ASV in non-experimental studies, including errors in the classification of studies and in statistical analyses. Consequently, they conducted a new and updated meta-analysis which also corrected for the problems of the earlier meta-analysis. Hald et al. (2010) found that there was in fact a significant association both between violent and non-violent pornography use and ASV, but that it was significantly stronger for the violent pornography. Furthermore, and particularly important for the present study, Hald et al. also found heterogeneity among the included studies to a degree indicative of moderating variables. Unfortunately, however, the available literature encompassed in this meta-analysis did not enable identifying the basis for such moderation. In the present study, we examine the possibility that individual differences among men may account for such moderation and thereby help reconcile the seemingly contradictory findings in the literature.

In order to properly assess the role of individual differences, it is necessary to overcome two shortcomings of the existing literature. First is the problem of the use of convenience samples only. In relying on such samples, various studies may be reporting data from different points along the ASV outcome dimension where different associations between pornography consumption and ASV actually exist. A second shortcoming in the overall literature on pornography and sexual aggression (including attitudes) has been the somewhat haphazard use of various measures to assess individual differences. These have included measures of "aggression anxiety" (Malamuth et al. 1980, p.123), self-reported likelihood of committing rape (Malamuth and Check 1985), psychoticism (Barnes et al. 1984; Check and Guloien 1989), hostile masculinity (Vega and Malamuth 2007), and psychopathy (Williams et al. 2009). Although all of these individual differences measures have interestingly shown some moderating effect in this area of research, it is preferable to assess risk within a comprehensive theoretical model.

One such model is the Confluence Model of Sexual Aggression (Malamuth 2003; Malamuth et al. 1991, 1995). It has integrated a large number of risk factors for committing sexual aggression, including ASV, within two separate constellations or statistical paths, labeled the Hostile Masculinity (HM) and the Impersonal Sex (IS) paths. The former path is essentially characterized by a personality profile combining two interrelated components: a) a narcissistic, defensive, hypersensitive, and hostile-distrustful orientation, particularly towards women, and b) sexual gratification from controlling or dominating women. The Impersonal Sex Path, often including a family history of abuse and some delinquent tendencies, is characterized by a promiscuous, non-committal orientation towards sexual relations. Sexual aggression is hypothesized to be most evident as the result or confluence of or interaction of these two paths. As such, each risk factor included within each of the two paths is predicted to actually result in sexual aggression primarily when it occurs in confluence with the other risk factors. Indeed, the interaction of the HM and IS paths of the Confluence Model has been found to be highly predictive of sexually aggressive behavior in both cross-sectional and longitudinal studies using both non-criminal and criminal populations (e.g., DeGue et al. 2010; Kingston et al. 2008; Knight and Sims-Knight 2003; Schatzel-Murphy et al. 2009). The findings have been consistent with various ethnic populations in North America (e.g., Abbey et al. 2006; Dean and Malamuth 1997; Hall et al. 2005; Malamuth et al. 1991, 1995; Wheeler et al. 2002), various types of community samples (e.g., Abbey et al. 2011; Greene and Davis 2011) and in such diverse countries as Singapore, (e.g., Lim and Howard 1998) Spain (Martin et al. 2005) and Sweden (Kjellgren et al. 2010).

To overcome these two limitations in the existing literature and assess the individual differences moderation, two conditions need to be met. First, a sample is needed with enough available background information to assess individual differences in risk as theorized by the Confluence Model. Second, this sample must encompass the full population distribution of both pornography consumption and the relevant outcome measure (here ASV) in order to enable the identification of differing associations that may exist within various ranges of these distributions.

Fortunately, a unique database collected some years ago provides all of the necessary information to adequately test the following three interrelated hypotheses:

Hypothesis 1: For the entire sample, there will be an overall association between amount of pornography use and ASV. This prediction is based on the fact that the cumulative literature, although not based on any representative samples, does show such a correlation, as revealed in the meta-analysis of Hald et al. (2010). We therefore predict that even though this overall association may actually be due to only a sub-sample of the population (see hypotheses below) it is sufficiently strong so as to nevertheless be evident in the analysis of the overall sample.

Hypothesis 2: Once individual differences are incorporated into the analyses, only men classified at the relatively highest risk level of sexual aggression, based on the other risk factors identified by the Confluence model, will show differences in ASV between those who consume

differing levels of pornography. This prediction is based on the Confluence model's prediction that the other risk factors can create a context whereby pornography consumption adds "fuel to the fire," and only when such a "fire" exists, does pornography consumption exacerbate existing tendencies and significantly influence outcomes, in this case increasing further attitudes supporting violence against women.

Hypothesis 3: Within this high-risk group, men who use pornography relatively frequently will have ASV scores significantly higher than their counterparts who use it relatively infrequently. This prediction is based on the Confluence model's assumption that consuming relatively large amounts of pornography is often both a reflection of some of the risk factors and may be an added cause of increased risk (Peter and Valkenburg 2009).

In summary, then, we tested three interrelated hypotheses predicting that while there will be an overall association between amount of pornography use and ASV in this representative sample, significant elevation of ASV will only be evident in men who both have a confluence of other risk factors and who are relatively high pornography consumers.

Method

Sampling Procedure

An attempt was made to survey a representative sample of males participating in any form of post high school education, which constitutes about 40% of that age group (U. S. Bureau of Statistics 1990, 2009). On the basis of the United States Department of Education records of the enrollment characteristics from the 3,269 institutions of higher education in the United States, institutions across the nation were sorted by location into the ten Department of Education regions of the United States (i.e., Alaska, Hawaii, New England, Mideast, Great Lakes, Plains States, Southeast, Southwest, Rocky Mountain, and West) at the time of sampling. Within each region, institutions were placed into homogeneous clusters according to five criteria: (a) location inside or outside of a standard metropolitan statistical area (SMSA) of certain sizes (i.e., SMSA greater than 1,000,000 people; SMSA less than 1,000,000 people; outside an SMSA); (b) enrollment above or below the national mean percentage enrollment of minority students; (c) control of the institution by private secular, private religious, or public authority; (d) type of institution, including university, other 4-year college, 2-year junior college, and technical/vocational; and (e) total enrollment within three levels (i.e., 1,000–2,499 students; 2,500–9,999 students; more than 10,000 students).

Two sampling rules were developed to select the schools to be recruited into the sample. First, the largest institution in each region was always included. Without this rule, it would have been possible to omit entirely the "Big Ten" or other major schools from the sample. Second, every 'xth' cluster was sampled according to the proportion of total enrollment accounted for by the region. Replacements were sought from among other schools in the homogeneous cluster if the original target proved uncooperative. Several exceptions to the sampling rules were made for the sake of reasonableness and cost constraint. The following types of schools were eliminated from the sample: Military schools, schools with enrollments of less than 1,000 students, schools not in the contiguous United States, and graduate schools with no undergraduate affiliation.

The process of obtaining institutional cooperation began by identifying the responsible individual in the central administration. Due to the nature of institutional decision making and to the controversial subject matter of the study, the amount of time required to obtain a sample was extensive; some schools required 15 months to arrive at a final decision. During that period, 93 schools were contacted and 32 participants were obtained. Nineteen of the institutions were first choices; the remaining 13 were solicited from among 60 replacements.

A random selection process was used to choose target classes and alternates in the case of schedule conflicts or refusals. The only limitations on class selection were that classes under 30 students and large lecture sections were eliminated to ensure that one experimenter's time on campus was used efficiently while avoiding classes that were too large for one person to handle. The actual number of classes visited was a mean of seven at smaller and medium-sized schools and a mean of 12 at major universities. The questionnaire was administered in classroom settings by one of eight post-master's level psychologists, including two men and six women who used a prepared script and were trained by the last author of the present article in standard procedures to handle potential untoward effects of participation. The questionnaire was completely anonymous and was accompanied by a cover sheet that contained all the elements of informed consent. Students who did not wish to participate were asked to remain in their seats and do other work. This insured that persons who objected to participation would not be stigmatized. Only 91 persons (1.5%) indicated that they did not wish to participate.

Participants

The participants consisted of 2,972 men enrolled in 32 post high school institutions in the U.S. randomly selected from all such institutions in the U.S. Mean age of participants

was 21 years (SD=3.88). The sample consisted of 86% Caucasians, 6% Afro-Americans, 3% Hispanic-Americans, 4% Asian-Americans, and 1% Native-Americans. Approximately 90% of the sample reported to be single, 9% married, and 1% divorced. Koss et al. (1987) presented detailed analyses showing that this sample is representative of the college population. Here we included only heterosexuals or bisexuals and we eliminated those with missing data on the dependent measures. For those missing data on some independent variables, they were replaced by the mean score for the entire sample, a conservative procedure that typically reduces rather than accentuates group differences.

Although the data analyzed in the current study were collected in 1984–85, we believe that their relevance to the issues addressed in the present paper remains considerable and the sample is very uniquely suited to the important issues addressed in this paper. Although the formal structuring and naming of the Confluence Model did not occur until the Malamuth et al. (2000) publication, its basic structure and the identification of the relevant risk factors and accompanying emphasis on the interaction of risk factors and on individual differences moderation had occurred well before the collection of the current data (e.g., Malamuth 1983, 1986; Malamuth and Check 1983). Therefore, although the data used here was not specifically designed to test the predictions of the Confluence Model, the decisions regarding risk factors to be assessed in this archival database were well informed by the studies leading to the formal development of the Confluence Model. Further, the hypothesized relationships posited on the basis of the Confluence Model are not "time constrained" and the fundamental psychological processes relating exposure to pornography to aggressive attitudes and/or behaviors are not likely to have fundamentally changed over the time interval.

We believe that the findings of the present study using the medium most used to access pornography at the time the data were collected do have considerable relevance to more recent time periods. The rise of the Internet in the late 1990s has undoubtedly changed the ease with which pornography may be accessed, particularly more "extreme" content (Coopersmith 2000). It used to be that most pornographic magazines and books were kept under lock and key at grocery stores and access was much more restricted to some adults. Of course, with sufficient effort youth could still get access to various types of sexual images by some means but it was often not as easy to do so and the materials were typically not very explicit and the images static. Today, however, anyone with an Internet connection can easily, anonymously, and without any cost, frequently watch even extreme pornographic movies with virtually every imaginable theme that would have been much more difficult to access in previous generations or even a decade ago.

As discussed by Coopersmith (2000), men's magazines were the primary vehicle for pornographic distribution from the early twentieth century to the 1970s. However, their popularity declined somewhat with the new technologies as films and video became more accessible and later the Internet, but these changes really took hold only beginning with the first major website, being launched by *Playboy* in 1995. Consequently, at the time the present data were collected in the mid-1980s, consumption of men's magazines (the operational definition used in the present study to assess pornography use) was still the primary source for accessing pornography (Coopersmith 2000). Clearly, if the data reported herein were to be collected at this time, it would be important to include information about participants' use of pornography via other media, particularly the Internet (see Coopersmith 2006, 2008 for a wide-ranging discussion of current pornography use). It is noteworthy, though, that even in research conducted recently, when types of media have been examined separately, the same general associations have been found between consumption of various types of pornographic media (magazines, movies, Internet, etc) and outcome measures such as sexually aggressive behavior (e.g., Ybarra and Mitchell 2005; Ybarra et al. 2011), although Ybarra et al. (2011), studying a large sample of American 10–15 year olds found that the strength of the associations was greater for Internet use than for magazines and movies.

Measures

Each participant completed a self-report questionnaire entitled "National Survey of Inter-Gender Relationships." The questionnaire consisted of approximately 330 questions divided into seven subsections. Only the relevant measures of sexual aggression, pornography consumption, and ASV are described here below.

Pornography Consumption

Frequency of pornography use was assessed by a one-item self-reported frequency of consumption of sexually explicit men's magazines. Using a 4 point scale ranging from Never (1), Seldom, (2), Somewhat Frequently (3), to Very Frequently (4), participants indicated how often they had read any of the following magazines: *Playboy, Penthouse, Chic, Club, Forum, Gallery, Genesis, Qui, or Hustler*. Although this question would not necessarily provide a reliable estimate of pornography consumption today as there are now many other media for the distribution of pornography, particularly the Internet, at the time of data collection the question was regarded as adequate (also see Taylor 2006). In addition, and perhaps more importantly it has been shown that the amount of exposure to such sexually explicit magazines is highly correlated with exposure to other forms of pornography,

including hardcore pornography in which graphic sex acts are shown or described (e.g., Boeringer 1994).

Attitudes Supporting Violence against Women (ASV)

An ASV composite mean score was created by summing the z-scores of three scales developed by Burt (1980): a) The 6-item Acceptance of Interpersonal Violence scale (AIV) scale (α=.57), which is very similar to that of previous research (e.g., Burt 1980; Malamuth and Check 1981) and is adequate for a short scale (since alpha coefficient is a direct function of the number of items on the scale), b) The 9-item Adversarial Sexual Beliefs (ASB) scale (α=.80), and c) The 19-item Rape Myth Acceptance (RMA) scale (α=.81). Participants responded to item statements using a 5-point scale ranging from "strongly disagree" to "strongly agree." Of the 2,972 participants, 2,666 responded to all three scales, 115 to one or two of the three scales and 191 to none of the three scales. Respondents not responding to any of the scales were excluded from analyses involving ASV.

Risk Levels of Sexual Aggression

As noted earlier, the current study is part of our research program testing the Confluence Model's efficacy in identifying risk factors for characteristics relating to men's sexual and related aggression against women. It is similar to risk analyses strategies in other areas, including epidemiological research (e.g., Turner et al. 2010). Most of this type of research has used a strategy of categorizing continues risk factor variables, although there are advantages and disadvantages to such a statistical strategy (Turner et al. 2010). The primary disadvantage is loss of statistical power, but as Altman (1998, 2005) has emphasized that "… with three or more categories the loss is small and is offset by a gain in simplicity and the avoidance of assumptions" (2005; p. 1). (Note that as described below, we used six categories). Turner et al. (2010) similarly concluded that "… categorisation may remove the need for any parametric assumptions regarding the shape (e.g. linearity) of the outcome/exposure relationship" (p. 9) and that the decision to categorise a continuous risk factor should be made in light of the various advantages and disadvantages, and that it will differ for each specific situation.

We analyzed the data in differing ways and decided to present the findings below in what we believed was the clearest way and the most consistent with previous research. We included the full range of responses for all of the variables (e.g., pornography consumption), but also used the same categorization of risk levels used by Malamuth et al. (2000). This may enable direct comparisons between their findings using sexually aggressive behavior and the current findings with attitudes. The conclusions presented are consistent with those emerging from the differing ways we analyzed the data.

Risk level of sexual aggression was calculated on the basis of the relative placement in the distribution of the two key components of the Confluence Model of Sexual Aggression. The Confluence Model of Sexual Aggression, as described earlier and detailed further below, was originally developed by Malamuth and associates in order to condense the large number of correlates of sexual aggressive behavior. Factor analyses showed that these correlates could be meaningfully organized into two main clusters of characteristics paths labeled "Hostile Masculinity" (HM) and "Impersonal Sex" (IS) (Malamuth et al. 1991, p. 676). The Hostile Masculinity Path is described as a personality profile combining two interrelated components: a) an insecure, defensive, hypersensitive, and hostile-distrustful orientation, particularly towards women, and b) sexual gratification from controlling or dominating women. Two scales were used here to assess Hostile Masculinity. The first scale, Negative Masculinity, was included as a personality measure that has been associated with the use of coercion in general and sexual aggression in particular (e.g., Vega and Malamuth 2007). It was developed by Spence et al. (1979) and consists of eight item (alpha=.79). It is a measure that has considerable overlap with assessments of a narcissistic personality (Malamuth 2003). Subjects indicated on 5-point scales ranging from "not at all like me" to "very much like me" whether brief statements applied to them (e.g., "I'm the greatest and better than other people"; "Most people are out for themselves and I don't trust them very much.")

The second scale used to assess the Hostile Masculinity path was the Hostility Toward Women scale (HTW) (alpha=.80) (Check 1985). Reliability and validity data were presented by Check (1985). Subjects indicated whether the statements were true or false. Examples are "I feel upset even by slight criticism by a woman," and "I rarely become suspicious with women who are more friendly than I anticipate."

The second path, Impersonal Sex, is characterized by a promiscuous, non-committal, orientation towards sexual relations. Here it was assessed by two items focusing on sexual promiscuity: Age of first sexual intercourse and the number of sexual intercourse partners since the age of 14. The first was a 10 level item ranging from "before the age of 15" to "22 or never." If a person was below the age of 22 and reported not having engaged in intercourse, the respondent's current age was coded for this item. The number of sexual intercourse partners since age 14 was assessed using an 8 point scale ranging from "none" to "over 50 people." These two variables have been used frequently to assess sexual "acting out" (Boislard et al. 2009; Elliott and Morse 1989) and are key dimensions used by some evolutionary psychologists to define a reproductive

strategy of relatively high quantity rather than quality investment (Gangestad and Simpson 2000; Ellis 1988). Newcomb and Bentler (1988) found that early sexual promiscuity was a strong predictor of a life-style pattern characterized by more promiscuous and more frequent sexual behavior. Other studies suggest that early sexual promiscuity often is associated with and seems to temporally follow general deviance and problem behaviors (Elliott and Morse 1989).

A calculation procedure of risk levels identical to that used by Malamuth et al. (2000) was conducted. More specifically, risk level of sexual aggression for each participant was obtained as follows:

1. Based on the confluence of both of the key composite predictors described above of the "The Hostile Masculinity Path" (HM) and "The Impersonal Sex Path" (IS) of the Confluence Model of Sexual Aggression (Malamuth et al. 1991, 1995) each participant was assigned a risk score for each path. This score was based on the participant's relative placement in the distribution of the HM and IS path. Thus, participants in the lowest 25% of the distribution path were assigned a "1" for that path. Participants in the middle of the distribution (25–75%), were assigned a "2" and those in the top 25% of the distribution were assigned a "3".
2. A total risk score was obtained by multiplying the separate scores for each of the two paths. Consequently, participants could achieve an overall risk score of 1, 2, 3, 4, 6, or 9. These risk scores were identical to the categorisation of participants into risk level of sexual aggression i.e. participants with a risk score of 1 was categorized under risk level 1 of sexual aggression, participants with a risk score of 2 was categorized under risk level 2 of sexual aggression and so forth.

Results

Overview of Analyses

The results are presented below in several subsections. First, we present descriptive statistics. Second, we test the first hypothesis using correlations so as to enable comparisons with other related findings that have reported their results as correlations. Third, we test the second and third hypotheses using ANOVA to examine whether there are main effects for and an interaction between Risk Level of Sexual Aggression and Pornography Use.

Descriptive Statistics

To have a basis for comparison to other samples and over time, we present in Table 1 the means and standard deviations by risk level of aggression for this representative sample of the raw scores for Adversarial Sexual Beliefs, Acceptance of Interpersonal Violence, Rape Myth Acceptance, and the Attitudes Supporting Violence against Women composite. For all variables (Adversarial Sexual Beliefs, Acceptance of Interpersonal Violence etc) within each risk level of sexual aggression one-way ANOVAs followed by post hoc Tukey tests were conducted. All one-way ANOVA tests were found to be significant at the $p<.001$ level with F values in the 18–52 range. Most post hoc Tukey tests for each variable were found to be significant at the $p<.05$ level indicating significant differences. Further data from these tests are not reported here but can be obtained from the second author.

Hypotheses Testing

We tested the following three interrelated hypotheses:

Hypothesis 1: Our first hypothesis predicted that for this entire representative sample, there will be an overall association between amount of pornography use and ASV. (Note that this hypothesis is also tested as part of the ANOVA reported below). We found that the overall sample correlation between pornography consumption and ASV was significant ($r=.12$, $N=2{,}781$, $p<.001$). The magnitude of this association is similar to those reported in related meta-analyses: Hald et al. (2010) in their meta-analysis of non-experimental studies examining only non-violent pornography found an average correlation, using 1,617 participants, of $r=.13$, $p<.001$. The correlation was $r=.18$, $p<.001$ when including both violent and non-violent pornography. Allen et al. (1995b) in their meta-analysis of experimental studies using all forms of pornography found an average correlation of $r=.146$, $p<.01$ using a combined sample of 2,248 participants. Although they concluded that both violent and non-violent pornography yielded significant effects, they found that violent pornography had a significantly higher association. Unfortunately, they did not report separately the actual correlations for violent and for non-violent pornography.

Hypotheses 2 and 3: Our second and third hypotheses predicted that once individual differences are incorporated into the analyses, only men classified at the relatively highest risk level of sexual aggression will show significant

Table 1 Means and Standard deviations for raw scores by risk level of sexual aggression for adversarial sexual beliefs, acceptance of interpersonal violence, rape myth acceptance, and the composite attitudes supporting violence against women

	Risk Level of Sexual Aggression Higher number denotes higher risk of sexual aggression[a]						
	Overall	1	2	3	4	6	9
Adversarial Sexual Beliefs*							
M	22.50	18.58	21.93	21.59	22.48	24.34	26.22
SD	6.33	5.52	6.17	6.78	5.51	6.06	6.54
N	2,777	180	655	378	658	721	185
Acceptance of Interpersonal Violence*							
M	13.08	11.89	12.71	12.88	12.87	13.60	14.65
SD	3.89	3.59	3.72	4.10	3.77	3.82	4.02
N	2,709	176	638	368	644	705	179
Rape Myth Acceptance*							
M	23.30	20.42	22.55	23.19	23.04	24.03	27.04
SD	7.24	6.71	6.58	8.04	6.58	7.19	8.86
N	2,671	175	630	362	633	694	177
Attitudes Supporting Violence against Women*							
M	58.83	50.69	56.24	57.71	58.38	61.95	67.83
SD	14.25	12.40	13.48	16.05	12.67	13.43	15.86
N	2,666	175	628	362	633	691	177

[a] Calculation of total risk scores are identical to those used by Malamuth et al. (2000) and are based on multiplying the risk scores of the two paths highlighted by the Confluence Model of Sexual Aggression (see Measures section of this article for details). For illustration, a risk level of '9' denotes a person scoring in the top 25 percentile of both The Hostile Masculinity Path and The Impersonal Sex Path of the Confluence Model. Possible range for scales used to compute the risk levels of each of the paths: Adversarial Sexual Beliefs 9–45; Acceptance of Interpersonal Violence 6–30; Rape Myth Acceptance 19–95; Attitudes Supporting Violence against Women 34–170. Higher scores indicated stronger Adversarial Sexual Beliefs, Acceptance of Interpersonal Violence, Rape Myth Acceptance and Attitudes Supporting Violence against Women Composite

*$p<.001$, using one-way ANOVA. F values in the 18–52 range

differences in ASV as a function of pornography consumption (i.e., hypothesis 2) and that within this high risk cohort it will be those who are relatively high pornography users who will significantly differ from those using relatively low levels of pornography (i.e., hypothesis 3).

To test the second hypothesis we used a 6 (Risk Level) by 4 (Pornography Use) factorial ANOVA on ASV Z-scores as the dependent variable. We found significant main effects of both Risk Level of Sexual Aggression (F, 5, 2781=13.10, $p<.001$) and Pornography Consumption (F, 3, 2781=7.18, $p=.001$) as well as a significant interaction (F,15, 2781=1.68, $p<.05$). The main effect for Risk Level indicated that men with higher risk had higher ASV scores and the main effect for Pornography Use indicating that higher pornography use was predictive of greater ASV. Finally, the significant interaction indicated that, as predicted, pornography use was predictive of differing levels of ASV depending upon men's risk levels (see Fig. 1).

To further probe this significant interaction effect we proceeded to conduct within each risk level of sexual aggression one-way ANOVAs followed by post hoc Tukey tests. In keeping with hypothesis 2, only men at the highest risk level of sexual aggression (i.e. risk level 9) showed significant differences in ASV as indicated by a significant one-way ANOVA test, $F(3)=4.98$, $p=.002$. Further, in keeping with hypothesis 3, within this high risk group, those who reported the two highest levels of pornography use ("very frequent" and "somewhat frequently") were found to hold significantly higher ASV than those who "never" consumed pornography ($p=.002$, $d=1.22$, 95% CI [−2.05, −0.35] and $p=.028$, $d=0.77$, 95% CI [−1.51, −0.06], respectively), for each of these comparisons). In addition, men who consumed pornography very frequently were also found to hold significantly higher ASV than those who reported that they seldom used pornography.($p=.045$, $d=0.71$, 95% CI [−1.16, −0.01]). No other significant within group differences were found for this high risk group ($p>.05$).

Table 2 Attitudes supporting violence against women Z-score means and standard deviations by pornography consumption at each risk level of sexual aggression

Risk Level of Sexual Aggression	Frequency of pornography consumption			
	Never	Seldom	Somewhat frequently	Very frequently
Risk Level 1—Very low risk (n=180)				
M	−.53	−.53	−.41	−.28
SD	.72	.77	.69	.76
N	56	106	12	6
Risk Level 2—Low risk (n=656)				
M	−.28	−.10	−.19	.02
SD	.79	.79	.81	.72
N	130	405	109	12
Risk Level 3—Low risk (n=378)				
M	−.22	−.12	.16	−.07
SD	.97	.85	.99	1.04
N	63	232	70	13
Risk Level 4—Low risk (n=659)				
M	−.14	−.02	−.06	.38
SD	.77	.73	.73	.53
N	81	441	122	15
Risk Level 6—Moderate risk (n=723)				
M	.19	.16	.20	.21
SD	.86	.77	.75	.80
N	75	446	162	40
Risk Level 9—High risk (n=185)*				
M	−.18	.43	.61	1.02
SD	1.03	.70	1.01	.94
N	11	101	56	17

Overall mean raw scores converted to Z scores with a mean of 0 and a SD of 1. Higher scores indicate stronger Attitudes Supporting Violence against Women

* p=.002, using one-way ANOVA test (F(3)=4.98, p=.002). Post hoc Tukey tests showed that within this high risk group, men consuming pornography "very frequently" and "somewhat frequently" held significantly higher ASV than men "never" consuming pornography (p<.05). Further, men consuming pornography "very frequently" were also found to hold significantly higher ASV than men "seldom" consuming pornography (p<.05)

Discussion

As a follow-up of the findings of a recent meta-analysis, we conducted analyses on an archival database representative of all American men in any post-high school education. That meta-analysis reported an overall positive association between pornography consumption and higher ASV as well as heterogeneity in the results, suggesting the presence of moderating effects.

We chose this database because it met two critical requirements needed to test the possibility that individual differences in risk for sexual aggression moderated such an overall association. First, this database contained the necessary background information needed to assess the theoretical framework (i.e., the Confluence Model) guiding our hypotheses about the characteristics of the individual differences in risk, and second, as a representative sample it encompassed the full range of the population distribution needed to test our predictions. Our analyses tested three interrelated hypotheses. In line with our first hypothesis, we successfully replicated the overall positive correlation between pornography use and attitudes. In support of our second hypothesis, analyses further showed an interaction effect between pornography use and levels of risk, classified based on risk factors highlighted by the Confluence Model. This finding revealed that the association between pornography use and attitudes supporting violence varied as a function of men's risk level for sexual aggression. Follow-up analyses showed that in keeping with the third hypothesis, only men at the highest risk level showed differences in attitudes as a function of pornography consumption. Within this high risk cohort it was found that participants who "very frequently"

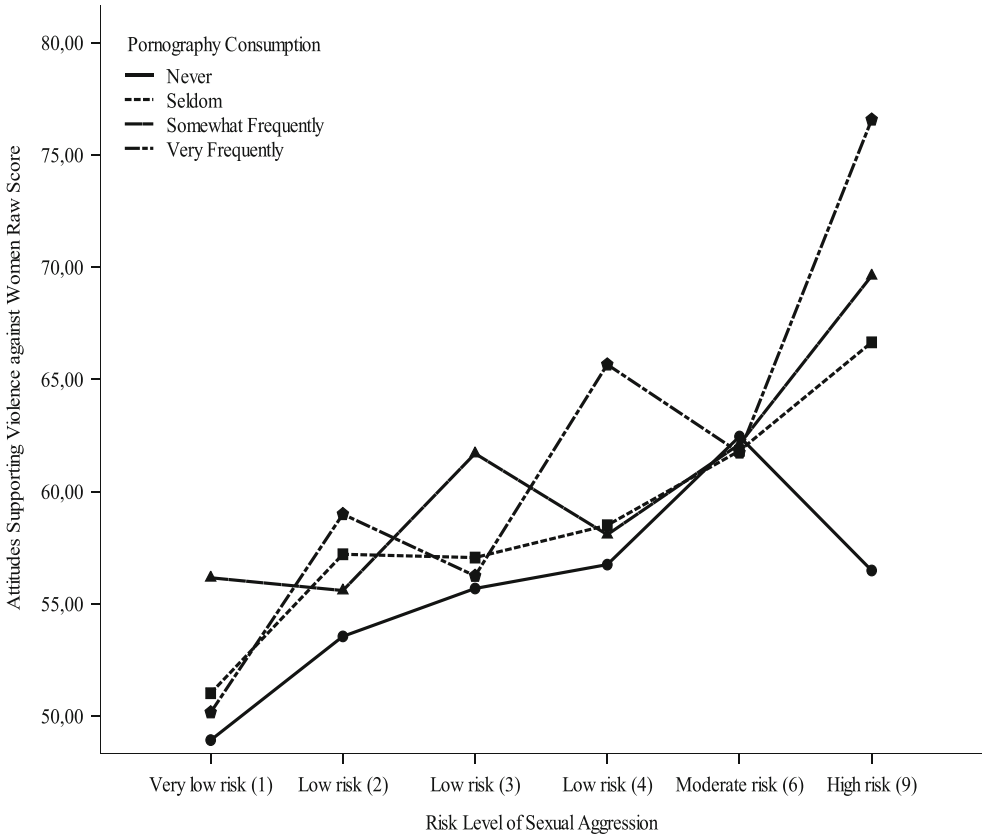

Fig. 1 Mean Attitudes Supporting Violence against Women Composite Raw Scores as a function of the six risk levels of the Confluence Model of Sexual Aggression (i.e. the cross-product of Hostile Masculinity and Impersonal Sex) and the four levels of reported use of sexually explicit magazines (Pornography Consumption). For the number of participants in each condition and the standardized values (Z-scores) of Attitudes Supporting Violence against Women Composite scores please see Table 2

reported using pornography held significantly higher attitudes supporting violence against women than those who reported "seldom" or "never" using pornography. Similarly, within this high risk cohort those who reported "somewhat frequently" using pornography had higher ASV than those reporting "never" using it.

By using a representative sample, we can feel confident in the generalizability of the findings. The findings with this sample suggest that the inconsistency in previous studies and the heterogeneity documented in the recent meta-analysis may be explained by the fact the none of the previous studies on ASV used representative samples and typically did not consider individual differences in risk as moderators. The lack of representative samples may have led differing researchers to unintentionally sample more heavily from various parts of the overall distribution. Therefore, some would find an overall association between pornography and attitudes while others would not. Our findings are also consistent with the results of experimental studies on attitudes as well as those focusing on aggressive behavior. They should therefore allay the doubts of researchers who had expressed skepticism about the generalizability of the experimental findings to real word settings (e.g., Lo and Ran 2005; Seto et al. 2001; Taylor 2006).

Moreover, now that we have similar conclusions emerging from a comprehensive meta-analysis (Hald et al. 2010) and the current study using a representative sample, we believe that there is adequate data to accept the following conclusions: For individuals with certain antisocial characteristics, heavy pornography exposure, particularly the violent and some other "extreme" content, may have bi-directional causal connections with ASV. Such individuals may be more likely to seek out such pornographic content (see discussion below) and at times be negatively influenced by it.

However, the relevant data have largely been derived from research with men from North America. Would the findings hold up in other countries? Hald and Malamuth (in preparation) reasoned that even in a country such as Denmark, which has been lauded as the quintessential example of a country where the wide availability of pornography has not had any negative effects, it may be found that for individuals who have relatively high antisocial tendencies, similar negative effects may be demonstrated. Indeed, these investigators did find support for this prediction. In keeping with the findings of the present study, using a representative sample of Danes, Hald and Malamuth (in preparation) recently showed that randomly assigning them to the type of pornography commonly available in that country resulted in an increase in attitudes supporting violence against women for people with relatively high antisocial personality characteristics but this effect was not found for other Danes.

What are the psychological processes that may account for associations found herein and in previous research? Although the present study showed correlational associations that could,

of course, be explained by "third variable" causes, as noted above, these findings are well complemented by many experimental studies, thereby supporting at least some causal connections. Could the findings be largely accounted for by positive portrayal of actual aggression or violence found in a relatively small portion of pornography? Content analytical studies conducted prior to the collection of the current data as well as more recent ones have shown that the majority of the content of pornography in magazines and the Internet is not clearly violent. Only a substantial minority, ranging from about 1%–15%, depending on the medium, definition of sexual violence, etc. is of a clearly violent nature (e.g., Barron and Kimmel 2000; Dietz and Sears 1988; Malamuth and Spinner 1980; Scott and Cuvelier 1993; Winick 1985). In contrast, though, recent content analyses of popular pornographic videos report that the majority of current popular pornography now includes verbal and/or physical aggression (e.g., Bridges et al. 2010; Sun et al. 2008). However, the definition of aggression used in that research included acts such as slapping buttocks, causing gagging, and calling a person names such as "bitch." While we recognize that many observers may consider such acts as indicators of aggression and degradation, such acts, without the clear intention to do harm, may not qualify as aggression or violence by commonly used scientific definitions of aggression, which do require harm intention (e.g., Geen 2001). Nevertheless, such pornographic content, which appears frequently in the "common fare" of pornography most sexually arousing to heterosexual males (Glascock 2005) does seem likely to be defined by most observers as intentional acts of sexual domination or even degradation (Cowan and Dunn 1994), regardless of whether it would meet the criteria for being defined as "aggression" by traditional scientific criteria. Such images, when primed repeatedly, may result in the chronic accessibility of attitudes that minimize the responsibility of men who commit acts of aggression against women and may generally reinforce the acceptance of dominating, controlling and perhaps even violent acts of aggression against women (e.g., Berkel et al. 2004; Lonsway and Fitzgerald 1995; Milburn et al. 2000). The individual differences moderation found in this study and previous research suggests that such activation may be particularly likely for "high risk" men who often already have hostile/power schemas associated with women and sexuality and who often view women as either "whores" vs. "madonnas" (Bargh et al. 1995; McKenzie-Mohr and Zanna 1990; Zurbriggen 2000). In keeping with the present findings, for relatively low risk men, who are less likely to have such schemas, exposure to non-violent pornography may not activate similar schemas because they are of relatively low occurrence or accessibility. Moreover, this possibility may help illuminate individual differences in the development of stronger schemas supporting violence against women in light of findings that men at greater risk for sexual aggression are more likely to choose to expose themselves to violent and other forms of "extreme" pornography. Indeed, research indicates that a profile very similar to that suggested by the Confluence Model (i.e., the interaction of antisocial dispositions and certain sexual proclivities) also predicts selection of such pornography when measured in the lab (Bogaert 2001) and when responsiveness to unsolicited Internet sexually explicit materials were assessed (Shim et al. 2007). Of course, it may still well be that frequent exposure over time to some types of pornography that portray aggression and/or degradation, particularly for youth, via other processes may contribute to the development of ASV even among those not necessarily at very high risk for sexually aggressive behavior (Wright et al. 2011).

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